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NATIONAL TECHNICAL ASSESSMENT
ITB-KOT-2021/0997 edition 1

This National Technical Assessment was issued in accordance with the Regulation of the Minister of Infrastructure and Construction of 17th November 2016 on National Technical Assessments (Dziennik Ustaw 2016, item 1968) by the Institute of Building Technology in Warsaw, at the request of:

Ciecholewski-Wentylacje Sp. z o.o.
Koźmin 30, 83-236 Pogódki

The National Technical Assessment ITB-KOT-2021/0997 edition 1 is a positive assessment of the performance of the following construction products for the intended use:

PPC ventilation ducts of rectangular cross-section

Date of validity of the National Technical Assessment:
14th December 2026

DIRECTOR of the
Institute of Building Technology
[*illegible signature*]
Robert Geryło, PhD, Eng.

[*round seal with the national emblem of the Republic of Poland in the centre and the following wording*: Institute of Building Technology]

Warsaw, 14th December 2021

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1. TECHNICAL DESCRIPTION OF THE PRODUCT

This National Technical Assessment covers PPC ventilation ducts of rectangular cross-section, manufactured by Ciecholewski-Wentylacje Sp. z o.o., Koźmin 30, 83-236 Pogódki, at its production plant in Koźmin.

The National Technical Assessment covers product types specified by the manufacturer and derived from the performance characteristics given in section 3 and the combination of materials and components.

The National Technical Assessment includes the following:

- straight ducts KT, acc. to Fig. A1,
- ducts with branch KT1, acc. to Fig. A2,
- ducts with branches KT11, acc. to Fig. A3,
- ducts with branch KT2, acc. to Fig. A4,
- ducts with branches KT22, acc. to Fig. A5,
- straight ducts K, acc. to Fig A6,
- rectangular stub pipes KSG, acc. to Fig. A7,
- symmetrical bends BS, acc. to Fig. A8,
- asymmetrical bends BA, acc. to Fig. A9,
- elbows B2R, acc. to Fig. A10,
- elbows WS, acc. to Fig. A11,
- elbows WA, acc. to Fig. A12,
- symmetrical adapters US, acc. to Fig. A13,
- symmetrical adapters UA, acc. to Fig. A14,
- asymmetrical adapters, single-sided, with rectangular branch UA1, acc. to Fig. A15,
- asymmetrical adapters, single-sided, with circular branch UA2, acc. to Fig. A16,
- symmetrical adapters (rectangle / circle) RS, acc. to Fig. A17,
- asymmetrical adapters (rectangle / circle) RA, acc. to Fig. Al18,
- offset pipes ES, acc. to Fig. A19,
- adapter offset pipes EA, acc. to Fig. A20,
- straight pipe tees TG, acc. to Fig. A21,
- adapter pipe tees TA, acc. to Fig. A22,
- branch pipe tees TM1, acc. to Fig. A23,
- double branch bendsTM2, acc. to Fig. A24,
- pipe tees TM3, acc. to Fig. A25,
- manifolds (dividers) HS, acc. to Fig. A26,
- manifolds (dividers) PT-U, acc. to Fig. A27,
- Cross pieces TSM, acc. to Fig. A28,
- plugs F, acc. to Fig. A29,
- roof bases PDAI and PDAII, acc. to Fig. A30 and A31,
- roof gangways PDP and PDPR, acc. to Fig. A32 and A33,
- roof plinths CDC and CDKC, acc. to Fig. A34 and A35,

- saddle cover plates NS5, acc. to Fig. A36.

The PPC ventilation ducts are made of galvanized steel sheet, grade DX51D+Z275 in accordance with PN-EN 10346:2015 or steel sheet with aluminium-zinc coating, grade DX51D+AZ185 in accordance with PN-EN 10346:2015.

The PPC ventilation ducts are made in the following air tightness classes in accordance with PN-EN 1507:2007 standard:

- A, for ducts made of galvanized steel sheet and steel sheet with aluminium-zinc coating, used at a static air pressure difference inside and outside the duct from -500 to 1000 Pa (execution class N according to WO-KOT/36/01 edition 2),
- D, for ducts made of galvanized steel sheet and steel sheet with aluminium-zinc coating, used at a static air pressure difference inside and outside the duct from -500 to 1000 Pa (execution class N as per WO-KOT/36/01 edition 2),
- D, for ducts made of galvanized steel sheet and steel sheet with aluminium-zinc coating, used with static air pressure difference inside and outside duct from -750 to 2000 Pa (execution class S according to WO-KOT/36/01 edition 2).

In tightness class A, for execution class N, straight ducts are joined longitudinally with machine locks (RAS type) and pipe fittings with sheet metal locks (Pittsburgh type lap joint). Overlap, spot-welded joints (for short elements) may also be used. Cross joints (flange frames) are made of P20 and P30 profiles (without sealing compound), and N20 and N30 corners. The range of application for the various profile and corner sizes is shown in Table B1, Attachment B. The frames of the flange connections are bolted at the corners. Corners are sealed with acrylic sealant and RAS-type machine locks are sealed with gel sealant. Between the transverse joints (frames), there is a gasket made of self-adhesive polyethylene foam tape (PES):

- with a width of not less than 15 mm and a thickness of not less than 4 mm - for ducts with a side no greater than 1000 mm,
- with a width of not less than 20 mm and a thickness of not less than 4 mm - for ducts with a side greater than 1000 mm.

In tightness class D, for execution class N, straight ducts are joined longitudinally with machine locks (RAS type), and the pipe fittings with sheet metal locks (Pittsburgh type lap joint). Overlap, spot-welded joints (for short elements) may also be used. Cross joints (flange frames) are made of P20 and P30 profiles (with butyl sealing compound), and N20 and N30 corners. The range of application of the different profile and corner sizes is shown in table B1, Attachment B. The flange connection frames are bolted at the corners. The Pittsburgh type corners and seam locks are sealed with acrylic sealant, and RAS type profiles and machine locks are sealed with gel sealant. Between the transverse joints (frames), there is a gasket made of self-adhesive polyethylene foam tape (PES):

- with a width of not less than 15 mm and a thickness of not less than 4 mm - for ducts with a side of not more than 1000 mm,

- with a width of not less than 20 mm and a thickness of not less than 4 mm - for ducts with a side greater than 1000 mm.

In tightness class D, for execution class S, straight ducts are joined longitudinally by means of machine locks (RAS type), and pipe fittings by means of sheet metal locks (Pittsburgh type lap joint). Overlap, spot-welded joints (for short elements), can also be used. Cross joints (flange frames) are made of P20 and P30 profiles (with butyl sealing compound), and N20 and N30 corners. The range of applicability of the different profile and corner sizes is shown in Table B1, Attachment B. The flange connection frames are bolted at the corners. Pittsburgh type corners and seam locks are sealed with acrylic sealant, and RAS type profiles and machine locks are sealed with gel sealant. Between the transverse joints (frames), there is a gasket made of self-adhesive polyethylene foam tape (PES):

- with a width of not less than 15 mm and a thickness of not less than 4 mm - for ducts with a side less than 800 mm,

- with a width of not less than 20 mm and a thickness of not less than 4 mm - for ducts with a side length of not less than 800 mm.

Crosswise profiles of flange frames are connected with the duct by welding.

Flanged connections of PPC ventilation duct sections are bolted in the corners with M8 and M10 bolts according to DIN 933 or PN-EN ISO 4017:2014, M8 and M10 nuts according to DIN 934 or PN-EN ISO 4032:2013, and M8 and M10 washers according to DIN 125.

For ducts with a side length of more than 400 mm, the frames are additionally bolted together using mounting (clamping) rings made of galvanized steel sheet, according to Fig. B1. The distance between the rings should not exceed 250 mm.

Sections of straight ducts with duct side dimensions larger than 800 mm are reinforced from the inside with brackets in the form of galvanized steel pipes with diameter of 16 mm, acc. to Fig. B2.

Minimum sheet (wall) thickness of straight ducts and pipe fittings (acc. to Fig. A1 + A36) made of galvanized steel sheet and steel sheet with aluminium-zinc coating is given in Table 1.

Table 1

Design class / Degree of protection	N/A	N/D	S/D
Long side dimension, mm	**Minimum sheet thickness, mm**		
100 ÷199	0.5	0.6	0.7
200 ÷ 249	0.5	0.6	0.7
250 ÷ 299	0.5	0.6	0.7
300 ÷ 399	0.5	0.6	0.7
400 ÷ 449	0.5	0.6	0.7
450 ÷ 499	0.5	0.6	0.7
500 ÷ 599	0.7	0.8	0.9
600 ÷ 699	0.7	0.8	0.9
700 ÷ 799	0.7	0.8	0.9
800 ÷ 899	0.7	0.8	0.9
900 ÷ 999	0.7	0.8	0.9

Table 1, cont.

Design class / Degree of protection	N/A	N/D	S/D
Long side dimension, mm	**Minimum sheet thickness, mm**		
1000 ÷ 1099	0.9	1.0	1.1
1100 ÷ 1199	0.9	1.0	1.1
1200 ÷ 1249	0.9	1.0	1.1
1250 ÷ 1399	0.9	1.0	1.1
1400 ÷ 1499	0.9	1.0	1.1
1500 ÷ 1599	0.9	1.0	1.1
1600 ÷1699	0.9	1.0	1.1
1700 ÷ 1799	0.9	1.0	1.1
1800 ÷ 1899	0.9	1.0	1.1
1900 ÷ 1999	0.9	1.0	1.1
2000	0.9	1.0	1.1

The method of connecting PPC ducts with flange profiles (flange frames) is shown in Fig. A37. The method of connecting PPC ducts with other ventilation system components is shown on Figures A38 and A39.

The materials and elements from which rectangular section PPC ducts are made are presented in Attachment C.

2. INTENDED USE OF THE PRODUCT

PPC ducts of rectangular cross-section are intended for air distribution in ventilation and air-conditioning systems in buildings, including residential buildings, collective housing and public utility buildings. They may also be used in warehouses, industrial and commercial buildings.

Straight ducts and pipe fittings can be used in the following conditions:

- temperature of transported air within the range from -30°C to +70°C,
- relative humidity of the transported air up to 100 %,
- transported air free from chemically aggressive and abrasive agents,
- air flow speed up to 16 m/s,
- static pressure difference between the air inside and outside the duct:
  - from -500 to 1000 Pa (execution class N, according to WO-KOT/36/01 edition 2) - applies to ducts made of galvanized steel sheet and steel sheet with aluminium-zinc coating, with tightness class A and D (sealed as per p. 1),
  - from -750 to 2000 Pa (execution class S, acc. to WO-KOT/36/01 edition 2) - applies to ducts made of galvanized steel sheet and steel sheet with aluminium-zinc coating, with tightness class D (sealed as per item 1).

Due to requirements concerning corrosion resistance, PPC ventilation ducts of rectangular cross-section are made of the following:

- galvanised steel sheet, grade DX51D+Z275 as per standard PN-EN 10346:2015, can be used in environments with corrosivity category C3 (long durability - H) and C4 (medium durability - M) in accordance with PN-EN ISO 9223:2012 and PN-EN ISO 14713-1:2017,
- steel sheet with aluminium-zinc coating, DX51D+AZ185 grade according to standard PN-EN 10346:2015, may be used in environments with corrosivity category C3 (very long durability - VH) and C4 (long durability - H) in accordance with standards PN-EN ISO 9223:2012 and PN-EN ISO 14713-1:2017.

Connecting elements should be protected against corrosion in a manner adapted to the corrosion resistance of the ducts.

PPC ventilation duct sections are classified in class A1 of reaction to fire in accordance with PN-EN 13501-1:2019 standard, on the basis of the European Commission Decision 96/603/EC, as amended according to the European Commission Decision 2000/605/EC.

PPC ventilation ducts were classified as class A2-s1,d0 of reaction to fire in accordance with PN-EN 13501-1:2019 standard and as non-flammable and non-drip according to the Regulation of the Minister of Infrastructure of 12th April 2002. (Dziennik Ustaw No. 75, item 690, as amended). In addition, the products are classified as not falling off under the influence of fire, and as not spreading fire inside and outside buildings. The above classification applies to PKC ducts fixed directly to elements of at least class A2-s3,d0 of reaction to fire in accordance with PN-EN 13501-1:2019 or at any distance from them.

For sealing connections of PPC ventilation ducts, sealing elements should be used as per section 1.

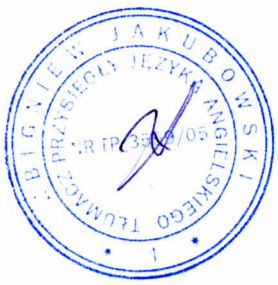
For connection of PPC ventilation ducts and pipe fittings with fans or other vibration generating devices, flexible stub ZEP made of steel sheet and glass fibre coated with polyurethane, manufactured by Ciecholewski-Wentylacje Sp. z o.o., classified in class A2-s1,d0 of reaction to fire in accordance with PN-EN 13501-1:2019 standard, and as non-flammable, non-drip and non-fire-spreading according to the Regulation of the Minister of Infrastructure of 12th April 2002, may be used. (Dziennik Ustaw of 2019, item 1065, as amended).

The method of connecting PPC ventilation ducts with other elements and devices of the system, as well as the method of thermal and/or acoustic insulation of ducts should be specified in the technical design prepared for a specific building facility.

PPC ventilation ducts should be suspended or supported in a way specified in the technical design.

PPC ventilation ducts should be used in accordance with:

- the technical design, developed for a specific facility, taking into account Polish standards and technical and construction regulations, in particular the Regulation of the Minister of Infrastructure of 12th April 2002 on technical conditions to be met by buildings and their location (Dziennik Ustaw of 2019, item 1065, as amended),
- provisions of this National Technical Assessment,
- instructions developed by the manufacturer, and provided to customers.



3. PERFORMANCE OF THE PRODUCT AND METHODS USED TO ASSESS IT

3.1. Dimensions

Dimensions of PPC ducts are in accordance with those specified in section 1 and Attachment A.

Dimensions are checked by means of universal measuring instruments with appropriate accuracy.

3.2. Wall thickness

The wall thickness of PPC ventilation ducts is in accordance with Table 1, in section 1.

Wall thickness is checked by means of universal measuring instruments with appropriate accuracy.

3.3. Tightness

PPC ventilation ducts with profiles without sealing compound, with gasket made of self-adhesive polyethylene foam tape (PES), with sealed corners and RAS locks as per section 1, are characterized by air tightness class A (execution class N).

PPC ducts, with profiles with sealing compound, with gasket made of self-adhesive polyethylene foam tape (PES), with sealed corners, Pittsburgh type locks and RAS type locks, as per section 1, are characterized as leakage class D (execution class N or S).

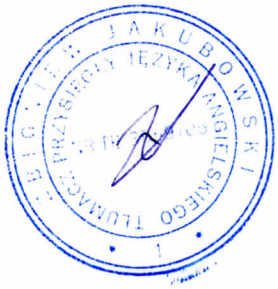
Tightness test is carried out in accordance with standard PN-EN 1507:2007 and WO-KOT/36/01 edition 2, in static pressure limits from -500 to 1000 Pa (execution class N) or from -750 to 2000 Pa (execution class S).

3.4. Strength

PPC ventilation ducts are characterized by strengths given in Table 2.

Table 2

Item	Essential characteristics	Performance	Assessment methods
1	2	3	*4*
1	Deformation	No permanent deformation or sudden change in tightness at static pressure limits	PN-EN 1507:2007 WO-KOT/36/01 edition 2 test conditions: from -500 to 1000 Pa (execution class N) from -750 to 2000 Pa (execution class S)
2	Deflection of duct, mm	≤ 0.4 % of the total tube length or 20 mm [1)]	
3	Deflection of duct connection, mm	≤ 1/250 of the length of the long side under the influence of the maximum pressure corresponding to the class of execution as per section 2	
4	Bulge and concavity, mm	≤ 3 % of the duct wall width or 30 mm [1)]	
[1)] The lower value should be taken			



3.5. Durability

Durability of PPC ducts of rectangular cross-section, connected with corrosive aggressiveness of the environment within the scope resulting from section 2, is ensured by protective anticorrosive coatings with properties given in Table 3.

Table 3

Item	Essential characteristics	Performance	Assessment methods
1	2	*3*	*4*
1	Zinc coating (steel sheet products, grade DX51D+Z275 according to PN-EN 10346:2015 standard)		
	a) coating mass, g/m^2	≥275	PN-EN 10346:2015
	b) coating thickness	20 Tolerance acc. to PN-EN 10346:2015	PN-EN ISO 2178:2016 PN-EN ISO 2808:2020
2	Aluminium-zinc coating (steel sheet products with aluminium-zinc coating, grade DX51D+AZ185 according to PN-EN 10346:2015 standard)		
	a) coating mass, g/m^2	≥ 185	PN-EN 10346:2015
	b) coating thickness	25 tolerance acc. to PN-EN 10346:2015	PN-EN ISO 2178:2016 PN-EN ISO 2808:2020

3.6. Fire classification

PPC ventilation duct sections meet the criteria for class A1 reaction to fire in accordance with PN-EN 13501-1:2019, based on European Commission Decision 96/603/EC, as amended according to European Commission Decision 2000/605/EC.

PPC ventilation ducts, used in accordance with section 2, are classified as class A2-s1,d0 of reaction to fire in accordance with PN-EN 13501-1:2019. The ducts are classified as non fire-spreading.

4. PACKAGING, TRANSPORT AND STORAGE AND THE METHOD OF MARKING THE PRODUCT

The products covered by this National Technical Assessment should be delivered in manufacturer's packaging, and stored and transported in a way that ensures unchanging of their technical properties.

The method of marking products with the construction mark should be in accordance with the Regulation of the Minister of Infrastructure and Construction of 17th November 2016 on the method of declaring the performance of construction products, and the method of marking them with the construction mark (Dziennik Ustaw of 2016, item 1966, as amended).

The marking of the product with the construction mark should be accompanied by the following information:

- the last two digits of the year in which the construction mark was first affixed to the construction product,
- name and address of the registered office of the manufacturer or an identification mark allowing to uniquely identify the name and address of the registered office of the manufacturer,
- name and indication of the type of construction product,
- the number and year of the national technical assessment according to which the performance was

declared (ITB-KOT-2021/0997 edition 1),

- the number of the national declaration of performance,
- the level or class of the declared performance,
- the address of the manufacturer's website if the national declaration of performance is available on it.

A safety data sheet and/or information on hazardous substances contained in a construction product, as defined in Article 31 or 33 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, should be supplied or, where appropriate, made available together with the national declaration of performance.

Furthermore, the labelling of a construction product, which is a hazardous mixture according to REACH, should be compliant with the requirements of Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (CLP), amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

5. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

5.1. National system of assessment and verification of constancy of performance

According to the Regulation of the Minister of Infrastructure and Construction of 17th November 2016 on the method of declaring the performance of construction products and the method of marking them with the construction mark (Dziennik Ustaw of 2016, item 1966, as amended), system 3 of assessment and verification of constancy of performance applies.

5.2. Type examination

The performance characteristics evaluated in section 3 constitute type testing of the product as long as there are no changes in raw materials, components, production line, or manufacturing facility.

5.3. Factory production control

The manufacturer shall have a factory production control system in place at the manufacturing site. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of rules and procedures, including records of tests conducted. The factory production control shall be adapted to the production technology, and ensure that the declared performance of the product is maintained in series production.

The factory production control includes specification and testing of raw materials and components, in-process inspection, and control tests (according to section 5.4), carried out by the manufacturer in accordance with the established test plan, and according to the principles and procedures laid down in the factory production control documentation.

The results of production control should be systematically recorded. The records shall confirm that the products meet the criteria for assessment and verification of constancy of performance.

Individual products or batches of products and their associated manufacturing details must be fully identifiable and reproducible.

5.4. Control tests

5.4.1. Test program. The test program includes.

a) current tests,
b) periodic tests.

5.4.2. Current tests. The current tests include checking the following:

a) dimensions,
b) duct wall thickness,
c) mass or thickness of zinc and aluminium-zinc coatings.

5.4.3. Periodic tests. The periodic tests include checking the following:

a) tightness,
b) strength.

5.5. Frequency of testing

Ongoing tests should be conducted in accordance with the established test plan, but not less frequently than for each batch of products. The batch size should be defined in the factory production control documentation.

Periodic tests should be performed at least once every 3 years.

6. INSTRUCTION

6.1. The National Technical Assessment ITB-KOT-2021/0997 edition 1 is a positive assessment of the performance of those essential characteristics of PPC ducts of rectangular cross-section, which in accordance with the intended use resulting from the provisions of the Assessment, affect the fulfilment of basic requirements by construction works in which the product will be used.

6.2. The National Technical Assessment ITB-KOT-2021/0997 edition 1 is not a document authorizing to mark a construction product with a construction mark.
In accordance with the Act of 16th April 2004 on construction products (Dziennik Ustaw of 2021, item 1213), the products covered by this National Technical Assessment may be launched or made available on the domestic market if the manufacturer has assessed and verified the constancy of performance, prepared a national declaration of performance in accordance with the National Technical Assessment ITB-KOT-2021/0997 edition 1, and marked the products with the construction mark in accordance with applicable regulations.

6.3. The National Technical Assessment ITB-KOT-2021/0997 edition 1 does not violate the rights arising from the provisions of the protection of industrial property, in particular the Act of

30th June 2000 - Industrial Property Law (Dziennik Ustaw of 2021, item 324). Ensuring these rights is the responsibility of the users of this National Technical Assessment ITB.

6.4. When issuing the National Technical Assessment, ITB shall not take responsibility for any possible infringement of exclusive or acquired rights.

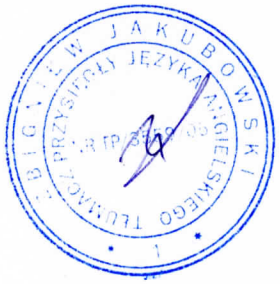
6.5. The National Technical Assessment does not release the manufacturer of products from the responsibility for their proper quality, and contractors of construction works from the responsibility for their proper application.

6.6. The validity of the National Technical Assessment may be renewed for further periods not exceeding 5 years.

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

7.1. Reports, test reports, evaluations, classifications

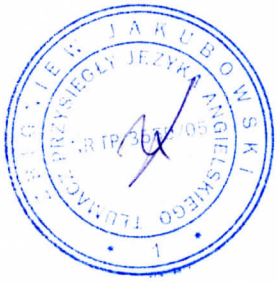
1. LZF01-1895/20/Z00NZF. Report on strength tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2020.
2. LZF02-1895/20/Z00NZF. Report on strength tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2020.
3. LZF01-1954/20/Z00NZF. Report on tightness tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2020.
4. LZF02-1954/20/Z00NZF. Report on tightness tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2020.
5. LZF01-01777/19/Z00NZF. Report on strength tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2019.
6. LZF02-01777/19/Z00NZF. Report on strength tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2019.
7. LZF01-01429/19/Z00NZF. Report on strength tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2019.
8. LZF04-01429/19/Z00NZF. Report on strength tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2019.
9. LZF05-01429/19/Z00NZF. Report on tightness tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, 2019.
10. LZF06-01429/19/Z00NZF. Report on tightness tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, 2019.
11. LZF07-01429/19/Z00NZF. Report on tightness tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, 2019.
12. LZF08-01429/19/Z00NZF. Report on tightness tests of PPC ventilation ducts of rectangular cross-section. Department of Thermal Physics, Acoustics and Environment of the ITB, Warsaw, 2019.
13. 01432.2/19/Z00NZP. PPC ventilation duct classification report on reaction to fire for the duct system. Fire Research Department of the ITB, 2019.



14. LZP01-01432/19/Z00NZP, LZP02-01432/19/Z00NZP, LZP03-01432/19/Z00NZP, LZP04-01432/19/Z00NZP, LZP05-01432/19/Z00NZP. Report on the testing of sealing materials used in ventilation ducts. Fire Research Department of the ITB, 2019
15. 02139/19/Z00NZP. Flexible stub pipe classification report. Fire Research Department of the ITB, 2019
16. LZP01-02139/19/Z00NZP, LZP01-02139/19/Z00NZP. Flexible stud pipe test reports. Fire Research Department of the ITB, 2019
17. LZM00-02084/19/Z00NZM. Report on durability tests of protective coatings of ventilation ducts. Department of Building Materials Engineering of the ITB, 2019
18. 02084/19/Z00NZM. Technical opinion on the durability of steel sheets intended for ventilation ducts in relation to the environmental corrosivity category. Department of Building Materials Engineering of the ITB, 2019.

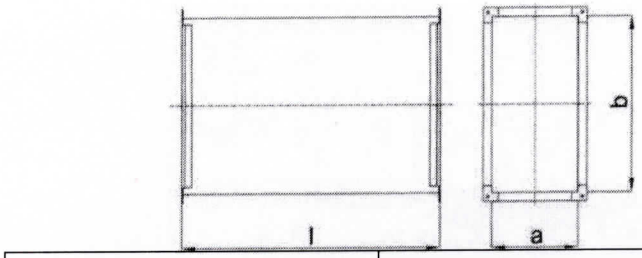
7.2. Standards and related documents

PN-EN 1505:2001	*Ventilation for buildings. Straight ducts and ventilation fittings made of sheet metal with a rectangular cross-section. Dimensions*
PN-EN 1507:2007	*Ventilation for buildings. Sheet metal ventilation ducts with a rectangular cross-section. Requirements for strength and tightness*
PN-EN ISO 4017:2014	*Fasteners. Hexagon head bolts fully threaded. Accuracy classes A and B*
PN-EN ISO 4032:2013	*Hexagonal nuts (type 1). Accuracy classes A and B*
PN-EN ISO 9223:2012	*Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and evaluation*
PN-EN ISO 14713-1:2017	*Zinc coatings. Guidelines and recommendations for corrosion protection of cast iron and steel structures. Part 1: General principles for design and corrosion resistance*
PN-EN ISO 2178:2016	*Non-magnetic coatings on a magnetic substrate. Coating thickness measurement. Magnetic method*
PN-EN ISO 2808:2020	*Paints and varnishes. Determination of the coating thickness*
PN-EN 10346:2015	*Continuously hot-dip coated steel flat products for cold forming. Technical conditions of delivery*
PN-EN 13501-1:2019	*Fire classification of construction products and building elements. Part 1: Classification using the results of reaction to fire*
DIN 125	*Washers: medium type, primarily for hexagon bolts*
DIN 933	*M 1.6 to M 52 hexagon head screws with thread up to the head; product grades A and B (modified version of ISO 4017)*
DIN 934	*Hexagon nuts with metric coarse and fine pitch thread; product grades A and B*
WO-KOT/36/01 edition 2	*Conditions for assessing the performance of a construction product. Ventilation ducts made of steel sheet*



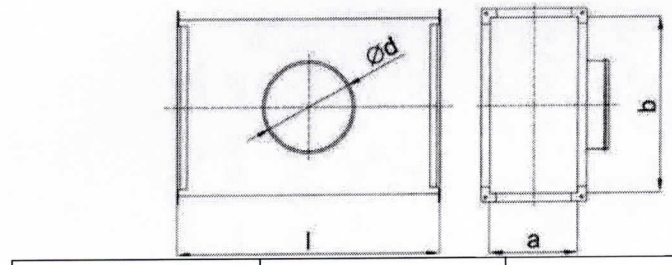
ATTACHMENTS

Attachment A.



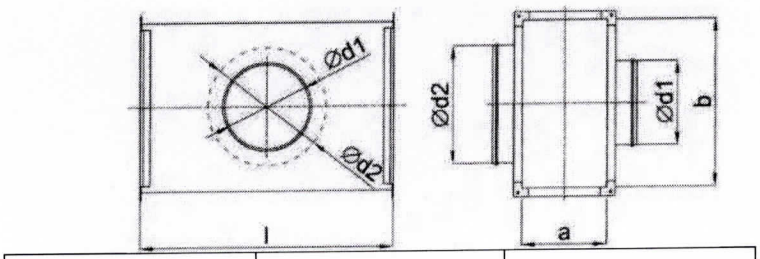
a, b, mm	l, mm
100 ÷ 2000	100 ÷ 900
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A1. Straight ducts KT



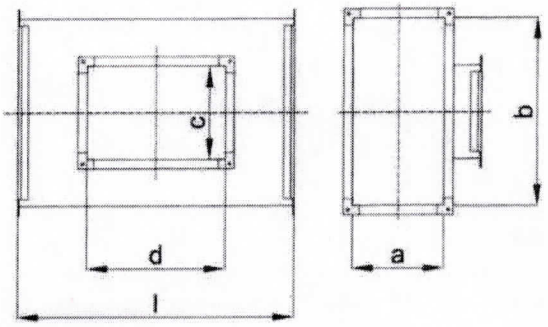
a, b, mm	Ød, mm	l, mm
100 ÷ 2000	63 ÷ 1250	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A2. Ducts with branch KT 1



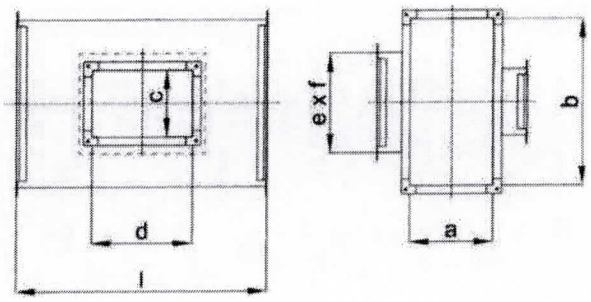
a, b, mm	Ø1, Ød2, mm	l, mm
100 ÷ 2000	63 ÷ 1250	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A3. Ducts with branches KT 11



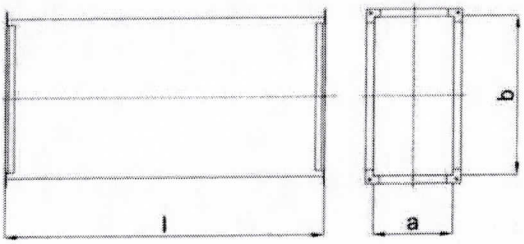
a, b, mm	c, mm	d, mm	l, mm
100 ÷ 2000	100 ÷ 1900	100 ÷ 1200	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001			

Fig. A4. Ducts with branch KT2



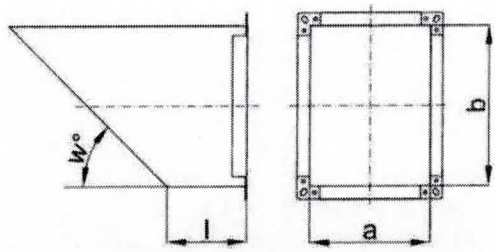
a, b, mm	c, e, mm	d, f, mm	l, mm
100 ÷ 2000	100 ÷ 1900	100 ÷ 1200	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001			

Fig. A5. Ducts with branches KT22



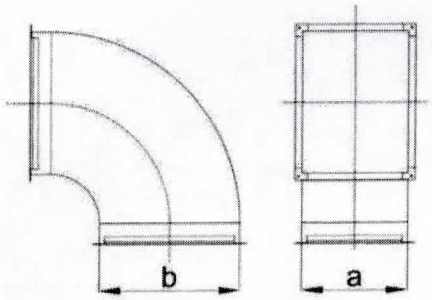
a, b, mm	l, mm
100 ÷ 2000	901 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A6. Straight ducts **K**



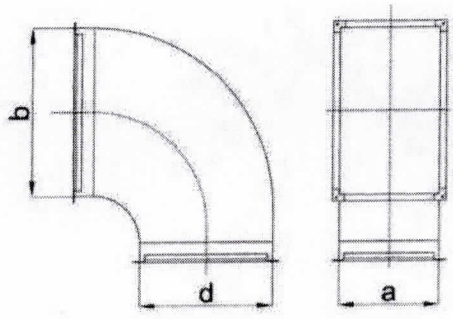
a, b, mm	l, mm	w, °
100 ÷ 2000	100 ÷ 1500	15 ÷ 90
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A7. Rectangular stub pipes KSG



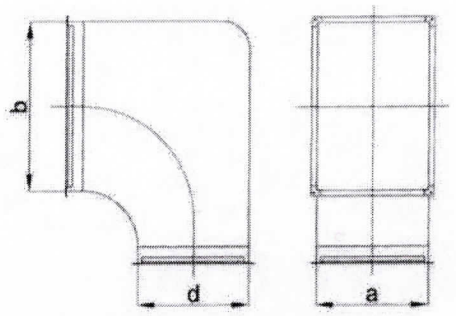
a, b, mm
100 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001

Fig. A8. Symmetrical bends BS



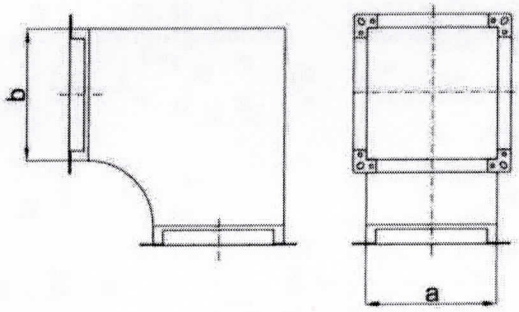
a, b, d, mm
100 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001

Fig. A9. Asymmetrical bends BA



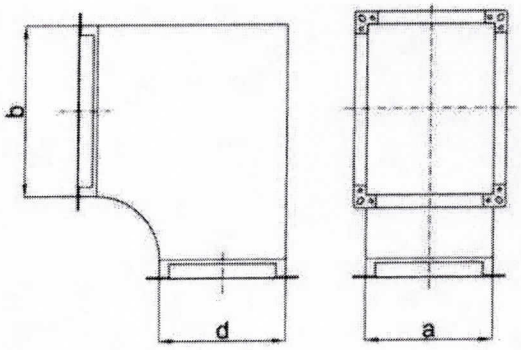
a, b, d, mm
100 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001

Fig. A10. Elbows B2R



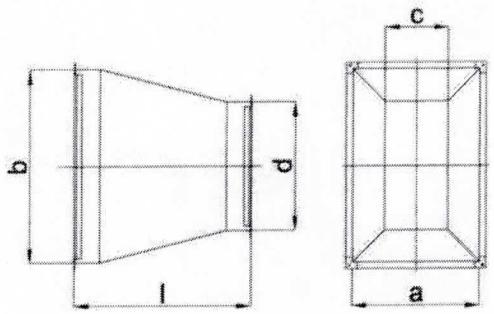
a, b, mm
100 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001

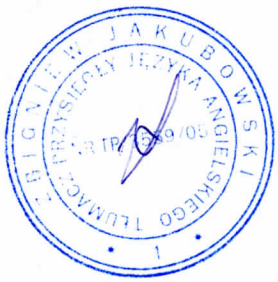
Fig. A11. Elbows WS



a, b, d, mm
100 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001

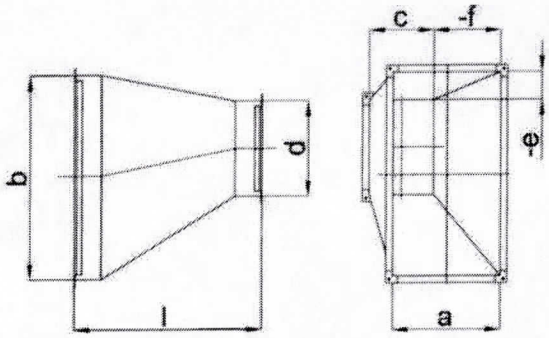
Fig. A12. Elbows WA





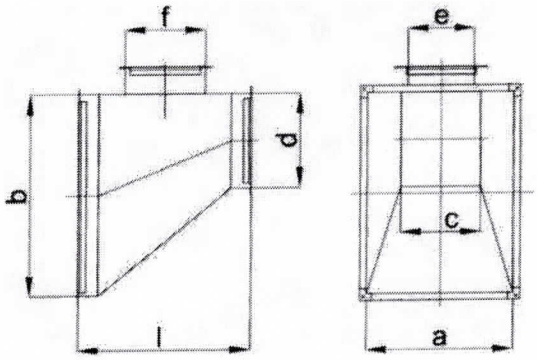
a, b, c, d, mm	l, mm
100 ÷ 2000	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A13. Symmetrical adapters US



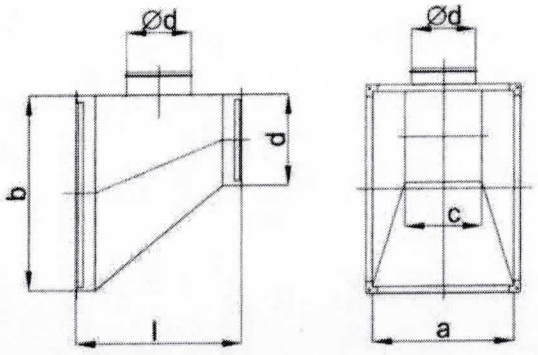
a, b, c, d, mm	e, f, mm	l, mm
100 ÷ 2000	0 ÷ 2000	100 ÷ 2500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A14. Asymmetrical adapters UA



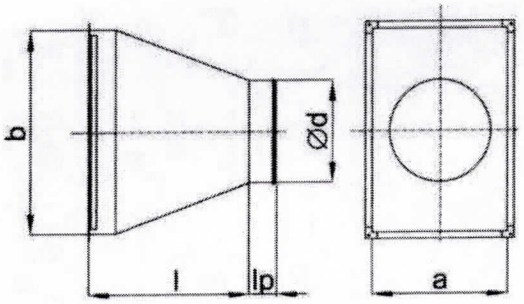
a, b, c, d, mm	f, mm	e, mm	l, mm
100 ÷ 2000	100 ÷ 2000	100 ÷ 1900	400 ÷ 2300
Dimension tolerance acc. to PN-EN 1505:2001			

Fig. A15. Asymmetrical adapters, single-sided, with rectangular branch UA1



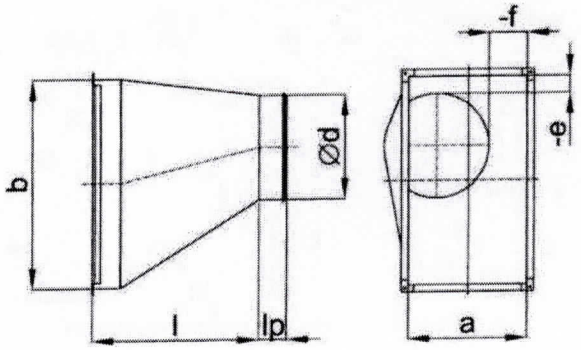
a, b, c, d, mm	Ød, mm	l, mm
100 ÷ 2000	63 ÷ 1600	350 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A16. Asymmetrical adapters, single-sided, with circular branch UA2



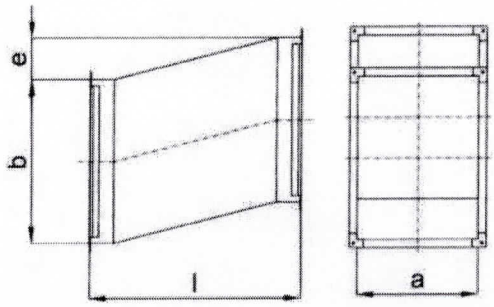
a, b, mm	Ød, mm	l, mm	lp, mm
100 ÷ 2000	80 ÷ 1600	100 ÷ 1500	30 ÷ 160
Dimension tolerance acc. to PN-EN 1505:2001			

Fig. A17. Symmetrical adapters (rectangle / circle) RS



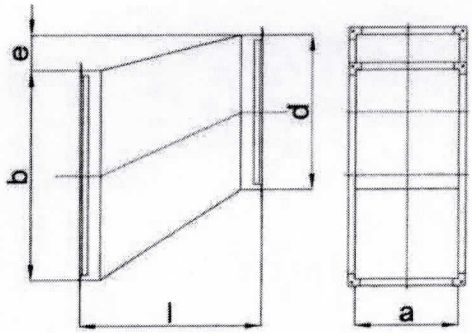
a, b, mm	e, f, mm	Ød, mm	l, mm	lp, mm
100 ÷ 2000	0 ÷ 1200	80 ÷ 1600	100 ÷ 1500	30 ÷ 160
	Dimension tolerance acc. to PN-EN 1505:2001			

Fig. A18. Asymmetrical adapters (rectangle / circle) RA



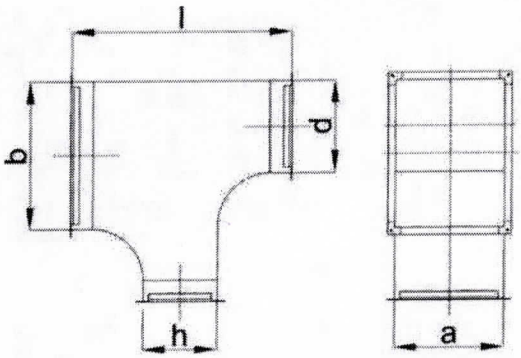
a, b, e, mm	l, mm
100 ÷ 2000	100 ÷ 2500
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A19. Offset pipes ES



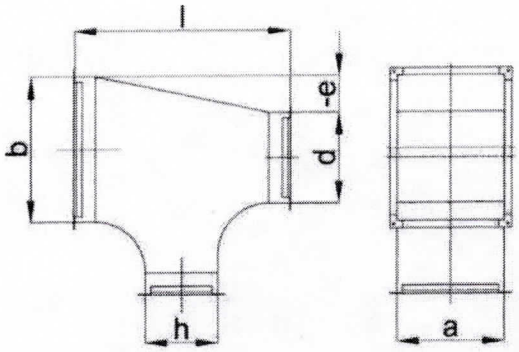
a, b, d, e, mm	l, mm
100 ÷ 2000	100 ÷ 2500
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A20. Adapter offset pipes EA



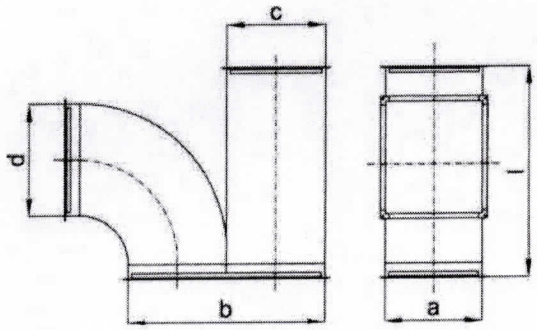
a, b, d, e, h, mm	l, mm
100 ÷ 2000	400 ÷ 2300
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A21. Straight pipe tees TG



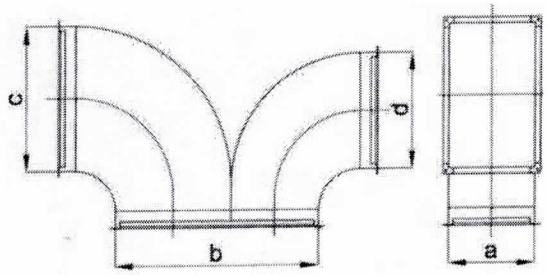
a, b, d, h, mm	e, mm	l, mm
100 ÷ 2000	0 ÷ 1900	400 ÷ 2300
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A22. Adapter pipe tees TA



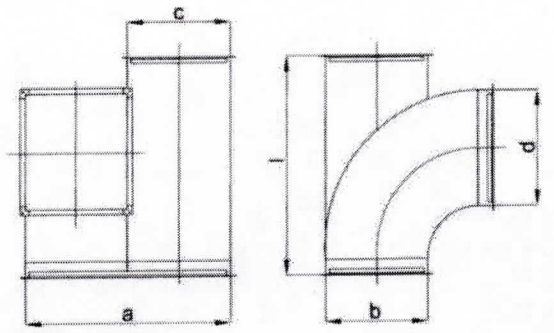
a, b, c, d, mm	l, mm
100 ÷ 2000	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A23. Branch pipe tees TM1



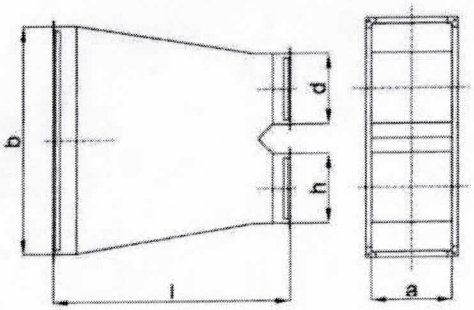
a, b, c, d, mm
100 ÷ 2000
Dimension tolerance acc. to PN-EN 1505:2001

Fig. A24. Double branch bends TM2



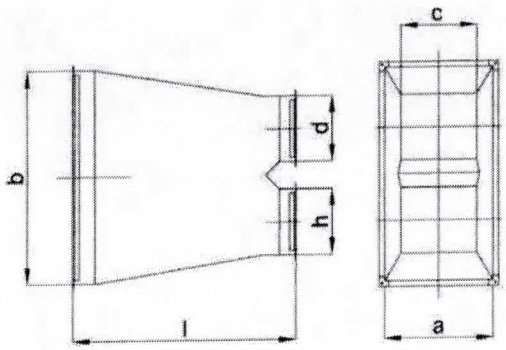
a, b, c, d, mm	l, mm
100 ÷ 2000	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A25. Pipe tees TM3



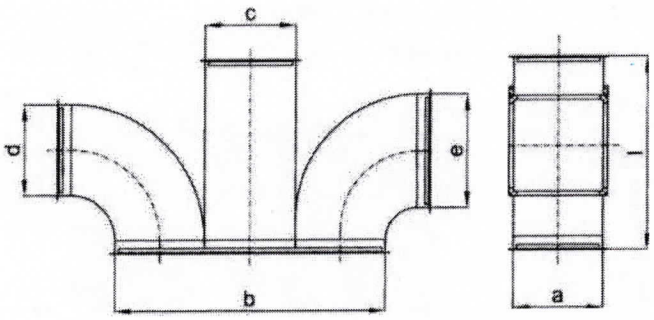
a, b, mm	d, h, mm	l, mm
100 ÷ 2000	100 ÷ 1800	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A26. Manifolds (dividers) HS



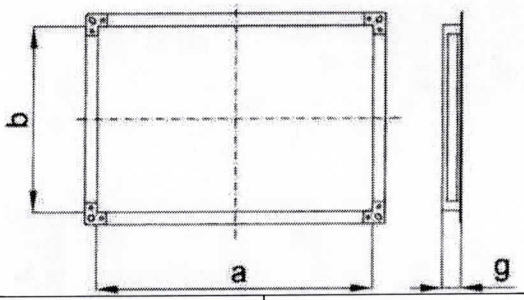
a, b, mm	c, d, h, mm	l, mm
100 ÷ 2000	100 ÷ 1800	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A27. Manifolds (dividers) PT-U



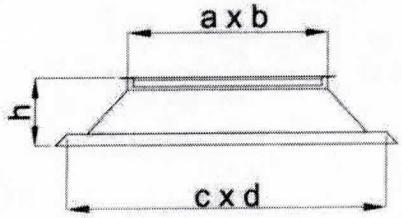
a, b, mm	c, d, h, mm	l, mm
100 ÷ 2000	100 ÷ 1800	100 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A28. Cross pieces TSM



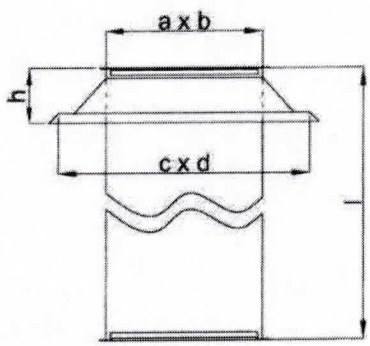
a, b, mm	g, mm
100 ÷ 2000	30 ÷ 50
Dimension tolerance acc. to PN-EN 1505:2001	

Fig. A29. Plugs F



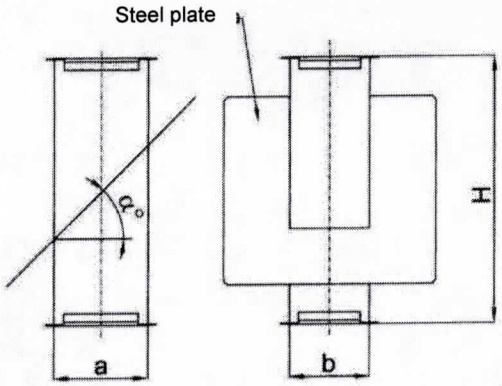
a, b, mm	c, d, mm	h, mm
100 ÷ 2000	400 ÷ 2500	160 ÷ 250
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A30. Roof bases PDAI



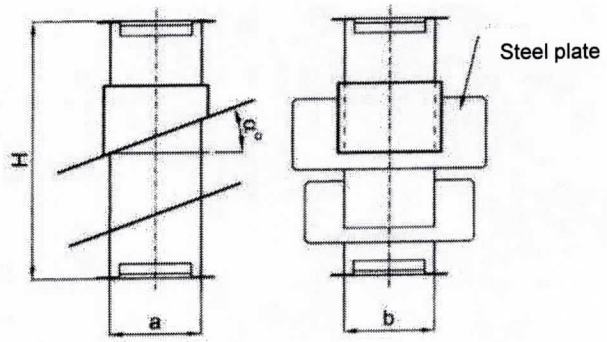
a, b, mm	c, d, mm	h, mm	l, mm
100 ÷ 2000	400 ÷ 2500	160 ÷ 250	100 ÷ 1000
Dimension tolerance acc. to PN-EN 1505:2001			

Fig. A31. Roof bases PDAII



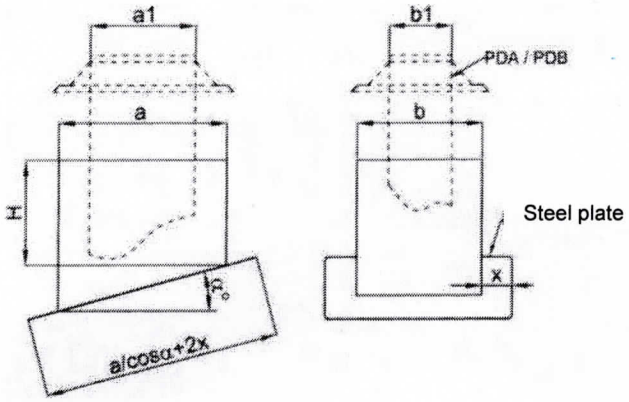
a, b, mm	α, °	H, mm
100 ÷ 2000	0 ÷ 60	1000 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A32. Roof gangways PDP



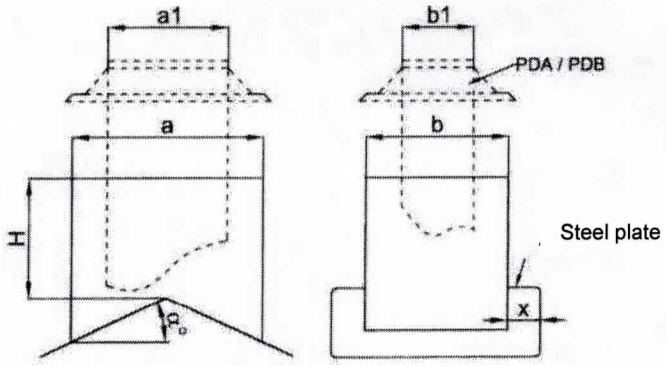
a, b, mm	α, °	H, mm
100 ÷ 2000	0 ÷ 60	1000 ÷ 1500
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A33. Roof gangways PDPR



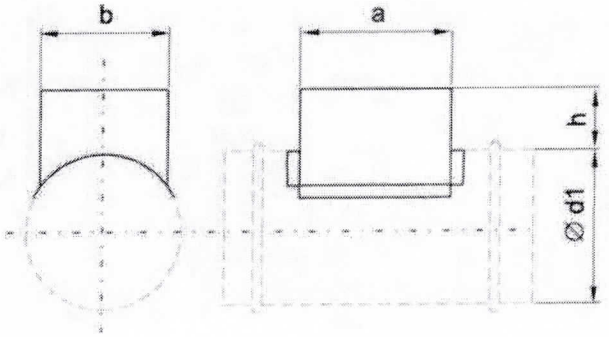
a, b, mm	a1, b1, mm	a,°	H, mm	x, mm
a1 + 280, b1 + 280	100 ÷ 2000	0 ÷ 45	300 ÷ 1000	50 ÷ 250
Dimension tolerance acc. to PN-EN 1505:2001				

Fig. A34. Roof plinths CDC



a, b, mm	a1, b1, mm	a, °	H, mm	x, mm
a1 + 280,b1 + 280	100 ÷ 2000	0 ÷ 45	300 ÷ 1000	50 ÷ 250
Dimension tolerance acc. to PN-EN 1505:2001				

Fig. A35. Roof plinths CDKC



Ød1, mm	a, b, mm	h, mm
80 ÷ 1250	80 ÷ 500	50 ÷ 200
Dimension tolerance acc. to PN-EN 1505:2001		

Fig. A36. Saddle cover plates NS5

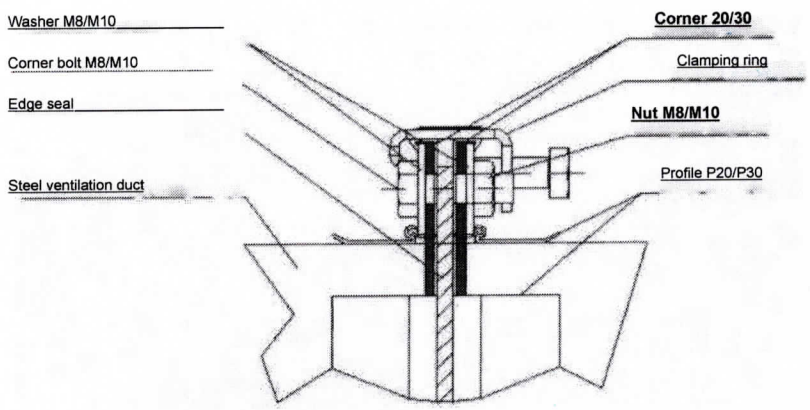
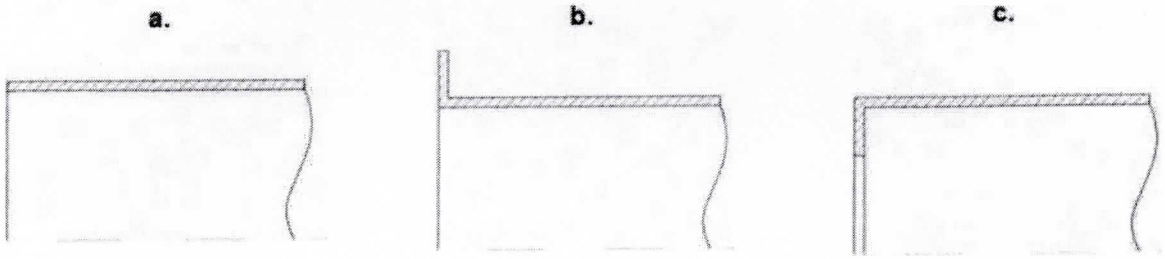
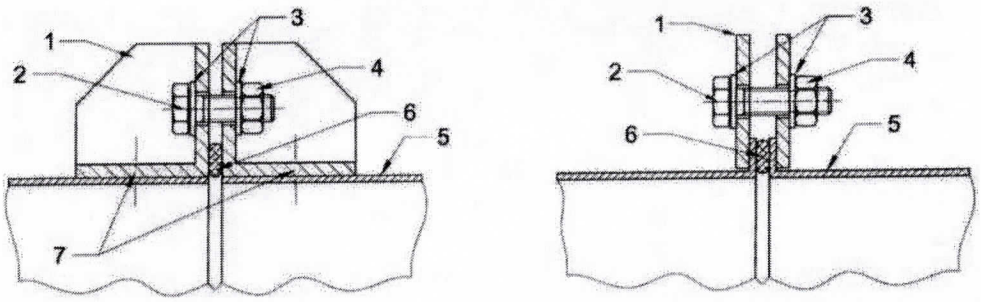


Fig. A37. Method of making connections of PPC ventilation ducts with a rectangular cross-section



a) pointed ending, b) outward ending, c) inward ending

Fig. A38. Method of connecting PPC ventilation ducts of rectangular cross-section with other ventilation system components



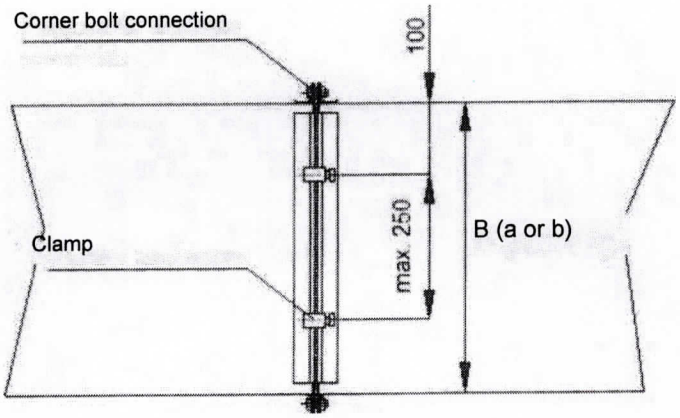
1 - frame (angle or flat bar); 2 - bolt; 3 - washer; 4 - nut; 5 - shaped sleeve; 6 - seal; 7 - flange to shaped sleeve connection with screws, rivets or welds

Fig. A39. Method of connecting PPC ventilation ducts of rectangular cross-section with other ventilation system components

Attachment B.

Table B1. Range of application for flange profiles

Performance class	Dimension of the long side of the duct, mm	Profile	Corner
N	≤ 1000	P20	N20
	> 1000	P30	N30
S	< 800	P20	N20
	≥ 800	P30	N30



For ventilation element side not less than 400 mm, steel clamping rings shall be used. The distance between the clamps should not be more than 250 mm.

Fig. B1. Application range for mounting (clamping) rings

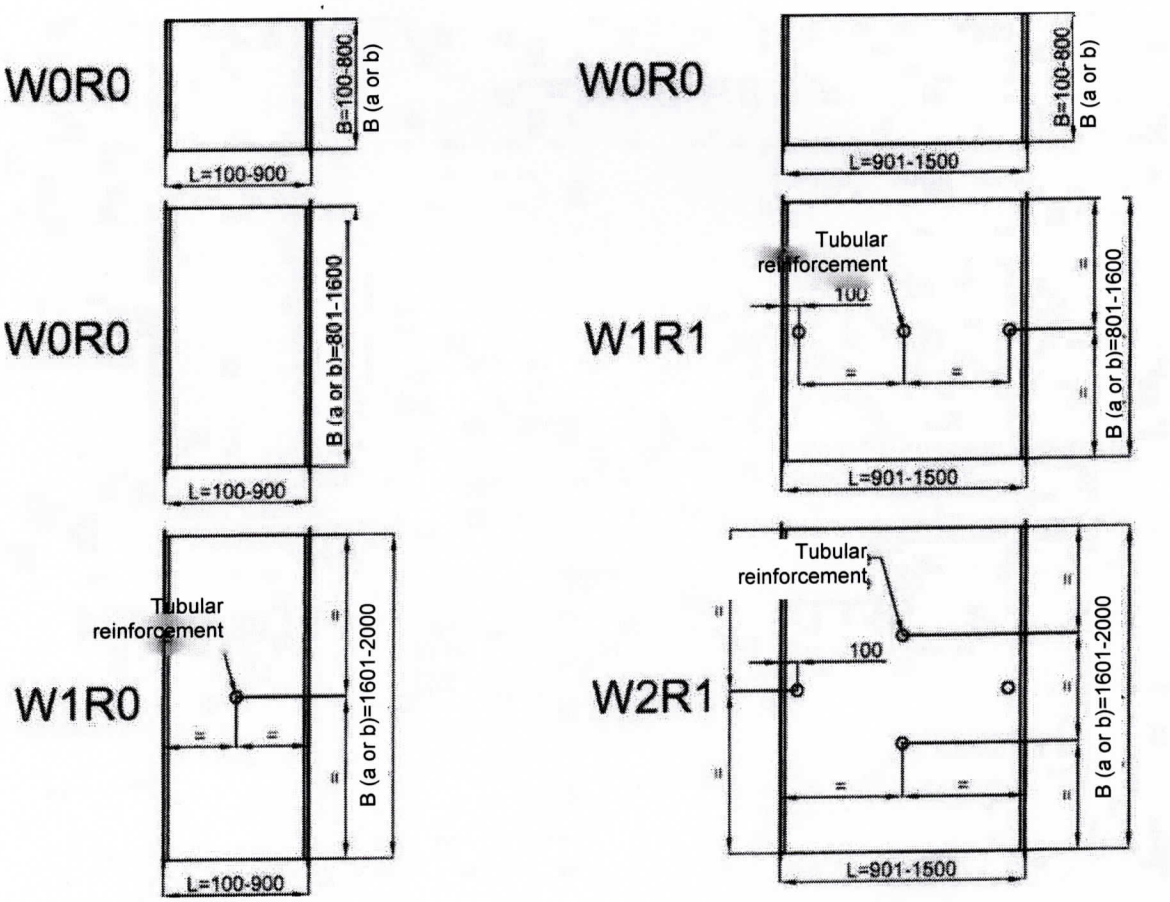


Fig. B2. Arrangement of internal brackets

Attachment C

For the production of PPC ventilation ducts, the following should be used:

- galvanised steel sheet, grade DX51D+Z275 as per standard PN-EN 10346:2015,
- steel sheet with aluminium-zinc coating, grade DX51D+AZ185 in accordance with standard PN-EN 10346:2015.

For the installation and sealing of PPC ventilation ducts the following should be used:

- polyethylene foam tape (PES), not less than 15 mm wide and not less than 4 mm thick,
- acrylic sealing compound,
- butyl sealing compound (factory applied in P20 and P30 profiles),
- gel sealant,
- M8 and M10 bolts in accordance with DIN 933 or PN-EN ISO 4017:2014,
- M8 and M10 nuts in accordance with DIN 934 or PN-EN ISO 4032:2013,
- M8 and M10 washers in accordance with DIN 125,
- P20 and P30 profiles made of galvanised steel sheet,
- N20 and N30 corners in galvanised steel sheet,
- mounting (clamping) rings in galvanized sheet steel,
- brackets made of galvanised steel tubing with an external diameter of no less than 16 mm and a wall thickness of no less than 2 mm.

Conformity of the above translation with the original presented to me is hereby certified.
Gniezno, 20th April 2022

Rep. no.: 137/2022 *Fee as agreed*